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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Makoto Ashiura

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EXAMINER

LEE, RIP A

ART UNIT

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1796

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/553,963	Applicant(s) ASHIURA ET AL.	
	Examiner RIP A. LEE	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 6-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 6-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1796

DETAILED ACTION

This office action follows a request for continued examination (RCE) under 37 § C.F.R. 1.114, filed on February 21, 2008. Claims 1-3 and 6-14 are pending.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-3 and 6-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 7, and 8 describe a modified conjugated diene-based polymer synthesized by reacting growing terminal anions formed by anionic polymerization of the conjugated diene-based polymer. The claim, as presented, would appear to recite two embodiments: conjugated diene-based polymer and those conjugated diene-based polymer derived from an aromatic vinyl monomer and a conjugated diene monomer. However, this description is incorrect because only the monomers undergo polymerization. Such language is reflected in the subsequent phrase, “an aromatic vinyl monomer and the conjugated diene monomer,” as well as in dependent claims 7 and 8.

There is insufficient antecedent basis for the limitation, “the conjugated diene monomer,” in the last line of claim 1.

Dependent claims 2, 3, 6, and 9-14 are subsumed under the rejection.

Art Unit: 1796

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 2, 6, 7, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoxmeier (U.S. 5,270,394) in view of Lakshmanan (U.S. 3,923,722).

Hoxmeier teaches end-capping and coupling of the reactive terminus of anionically polymerized polymers of styrene, butadiene, isoprene, or mixtures thereof (col. 2, lines 20-23), with a fullerene. A styrene-butadiene block copolymer is an example a copolymer comprised of a mixture of the recited monomers (approx 34 wt % styrene, see example 2). The molecular weight of the polymers lies in the range of 500 to 500,000 (col. 4, line 24). The polymer/fullerene products are believed to be linear (1 polymer arm/fullerene) or star shaped (2-20 polymer arms/fullerene), with a ratio of 0.05-1 fullerene/chain (col. 6, line 28). In another example, the ratio of polymer to fullerene lies in the range of 1-10, corresponding to 0.01-1 fullerene/chain (col. 6, line 64). Note that these ratios lie squarely within the claimed range. Hoxmeier contemplates use of novel polymers in adhesives (col. 5, lines 37-40), but the reference does not disclose use of filler.

Lakshmanan discloses adhesive compositions made from styrene-butadiene block copolymer. The inventor discloses that conventional adhesive formulations of this type contain up to 5 wt % of silica as a thixotropic agent (col. 2, line 15). The combination of teachings would have suggested to one having ordinary skill in the art to add silica to adhesive formulations containing the polymers of Hoxmeier in order to adjust and optimize the viscosity of said adhesive. Therefore, it would have been obvious to one having ordinary skill in the art to use up to and including 5 wt % of silica in adhesive formulations containing Hoxmeier's polymers, and since this practice is disclosed in the prior art, one having ordinary skill in the art would have expected addition of silica to work in this capacity with a high degree of success. The selection of a known material based on its suitability for its intended use supports *prima*

Art Unit: 1796

facie obviousness. *Sinclair & Carroll Co vs. Interchemical Corp.* 325 U.S. 327, 65 USPQ 297 (1945).

5. Claims 1, 2, 6, 7, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoxmeier (U.S. 5,270,394) in view of Majumdar *et al.* (U.S. 6,186,202).

Hoxmeier teaches end-capping and coupling of the reactive terminus of anionically polymerized polymers of styrene, butadiene, isoprene, or mixtures thereof (col. 2, lines 20-23), with a fullerene. A styrene-butadiene block copolymer is an example a copolymer comprised of a mixture of the recited monomers (approx 34 wt % styrene, see example 2). The molecular weight of the polymers lies in the range of 500 to 500,000 (col. 4, line 24). The polymer/fullerene products are believed to be linear (1 polymer arm/fullerene) or star shaped (2-20 polymer arms/fullerene), with a ratio of 0.05-1 fullerene/chain (col. 6, line 28). In another example, the ratio of polymer to fullerene lies in the range of 1-10, corresponding to 0.01-1 fullerene/chain (col. 6, line 64). Note that these ratios lie squarely within the claimed range. Hoxmeier contemplates use of novel polymers in adhesives (col. 5, lines 37-40), but the reference does not disclose use of filler.

Majumdar *et al.* teaches that adhesives for cushion layers which are derived from diene-elastomers compounded with carbon black suffer from high heat generation during flexing (col. 1, lines 22-24). To solve this problem, adhesives are compounded with about 15 to about 80 parts by weight of silica (col. 2, lines 44-48). Adhesives may contain low levels of carbon black (col. 2, lines 55-59). The combination of teachings would have suggested to and would have motivated one having ordinary skill in the art to incorporate silica into adhesive formulations containing the polymers of Hoxmeier in order to prevent problems associated with high heat generation improve heat dissipation. Therefore, it would have been obvious to one having ordinary skill in the art, making solventless adhesives containing Hoxmeier's polymers, to incorporate silica in an amount of about 15 to about 80 parts by weight in order improve heat dissipation properties of the adhesive. Since this practice is taught by Majumdar *et al.*, one having ordinary skill in the art would have expected addition of silica to work in this capacity with a high degree of success. The selection of a known material based on its suitability for its

Art Unit: 1796

intended use supports *prima facie* obviousness. *Sinclair & Carroll Co vs. Interchemical Corp.* 325 U.S. 327, 65 USPQ 297 (1945).

6. Claims 1-3 and 6-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoxmeier in view of Nakajima *et al.* (JP 59-12948).

The discussion of the disclosures of the prior art of Hoxmeier from the previous paragraph of this office action is incorporated here by reference. Hoxmeier contemplates use of novel polymers in blends with other thermoplastics for molding applications (col. 5, lines 37-40). The reference is silent with respect to curing, and it is silent regarding the details of preparation of these blends.

Nakajima *et al.* teaches a polyblend comprising styrene-butadiene copolymer and EPDM which is extruded and cured. In order to carry out curing, sulfur is used as the vulcanizing agent in an amount of about 2.5 parts by weight (table 3). As is known in the art, curing affords a dimensionally stable material with improved mechanical strength.

It would have been obvious to one having ordinary skill in the art to make a molded composition out of Hoxmeier's polymers because the inventor contemplates this end use, and one of ordinary skill in the art cure the rubber with a similar amount (about 2.5 parts by weight) of vulcanizing agent to accomplish this step. One of skill in the art would have been motivated to increase the mechanical strength of the rubber by vulcanization, especially where polymers are formed into extruded articles. Since Nakajima *et al.* teaches this conventional process, the skilled artisan would have expected the combination of teachings to work with a reasonable expectation of success.

Hoxmeier is also silent with respect to use of reinforcing filler, however, one of skill in the art would have found it obvious to incorporate filler in order to improve the strength of the rubber composition because Nakajima *et al.* teaches incorporation of about 30-150 parts of carbon black filler in order to accomplish this goal. One of ordinary skill in the art would have found it obvious to use carbon black filler in the composition of Hoxmeier because Nakajima *et al.* shows that practice is well-known in the art for improving physical strength of rubber compositions.

Art Unit: 1796

Response to Arguments

7. The rejection of claims over Hoxmeier in view of Lakshmanan, set forth in the previous office action dated October 23, 2007, has been overcome by amendment. A new rejection based on these two references has been applied to amended claims (*supra*). Applicant's comments have been considered but are moot in view of the new grounds of rejection

Applicant's arguments with respect to the rejection of claims over Hoxmeier in view of Nakajima *et al.* have been considered fully, but they are not persuasive. Applicant submits that Nakajima *et al.* does not overcome the deficiencies in Hoxmeier to render unpatentable the present claims, but Applicant has not addressed the rejection at hand which is based on obviousness to incorporate vulcanization agent to vulcanize the product for molding applications. In light of these considerations, the rejection has been maintained.

Applicant's arguments with respect to the rejection of claims over Hoxmeier in view of Lukich *et al.* have been considered. The references have been reviewed, it is deemed that there is inadequate suggestion or motivation to modify the compositions of Lukich *et al.* with the composition of Hoxmeier to the extent that the overall composition, and in particular, a obtaining the requisite level of fullerene, is met by combination of teachings. Upon further consideration, the rejection has been withdrawn.

Art Unit: 1796

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu S. Jagannathan, can be reached at (571)272-1119. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

/Rip A. Lee/
Primary Examiner, Art Unit 1796

April 15, 2008